Report for Assignment2 Ken Amamori
3/2/2021

Part A: Write a program to connect to port 80 on nigelward.com; request the index.html file, and report the value of bytes 1012 through 1028.

```
#!/usr/bin/env python3
from socket import *

#part A
s = socket(AF_INET, SOCK_STREAM)
s.connect(("nigelward.com", 80))
s.sendall(("GET /index.html HTTP/1.1\r\n" +
    "Host: nigelward.com\r\n" +
    "Accept: text/html\r\n" +
    "Connection: close\r\n\r\n").encode())
data = s.recv(1012).decode()
data = s.recv(16).decode()
print(data)
s.close()
```

Output:

```
student@systems-vm:~/os/operations_system/sockets_assignment2> python3 part_a.py
dy Research and
student@systems-vm:~/os/operations_system/sockets_assignment2>
```

Part B: Python is only willing to send bytes via sockets, so if I want to send the number 256, for example, I have to do something on the server side, like str(256) + '\n' and then on the client side something like int(whatWasReceived). Some people prefer to do (256).to_bytes(2, byteorder=big) on the server side, and on the client side do int.from_bytes(received, byteorder=big).

a) Modify server-demo.py and your client to see if you can really send numbers this way.

Client

```
#!/usr/bin/env python3
from socket import *
s = socket(AF_INET, SOCK_STREAM)
s.connect(("127.0.0.1", 7069))

while 1:
    data = s.recv(10000)
    data = int.from_bytes(data, byteorder="big")
    if data == 0:
        break
    print(data)
s.close()
```

Server

```
#!/usr/bin/env python3
from socket import *
s = socket(AF_INET, SOCK_STREAM)
s.bind(("127.0.0.1", 7069))
s.listen(5)

while True:
    c,a = s.accept()
    data = c.send((256).to_bytes(2, byteorder = 'big'))
    c.close()
```

Output:

```
student@systems-vm:~/os/operations_system/sockets_assignment2> python3 part_ba_client.py
256
```

b) Show what happens if one side instead uses byteorder=small.

Client

```python
#!/usr/bin/env python3
from socket import *
s = socket(AF_INET, SOCK_STREAM)
s.connect(("127.0.0.1", 7069))

while 1:
    data = s.recv(10000)
    data = int.from_bytes(data, byteorder="big")
    if data == 0:
        break
    print(data)
s.close()
```

Server

```python
#!/usr/bin/env python3
from socket import *
s = socket(AF_INET, SOCK_STREAM)
s.bind(("127.0.0.1", 7069))
s.listen(5)

while True:
    c,a = s.accept()
    data = c.send((256).to_bytes(2, byteorder = 'little'))
    #data = c.send((256).to_bytes(2, byteorder = 'small'))
    c.close()
```

Output:

```
student@systems-vm:~/os/operations_system/sockets_assignment2> python3 part_bb_client.py
1
```

Client

```python
#!/usr/bin/env python3
from socket import *
s = socket(AF_INET, SOCK_STREAM)
s.connect(("127.0.0.1", 7069))

while 1:
    data = s.recv(10000)
    data = int.from_bytes(data, byteorder="little")
    if data == 0:
        break
    print(data)
s.close()
```

Server

```python
#!/usr/bin/env python3
from socket import *
s = socket(AF_INET, SOCK_STREAM)
s.bind(("127.0.0.1", 7069))
s.listen(5)

while True:
    c,a = s.accept()
    data = c.send((256).to_bytes(2, byteorder = 'big'))
    c.close()
```

Output:

```
student@systems-vm:~/os/operations_system/sockets_assignment2> python3 part_bb_client.py
1
```

c) Read the python sockets page description of htons() and ntons() and experiment with them to determine whether the machine you are using is big-endian or little-endian.

```python
import socket
if socket.ntohs(256) == 1:
    print("Little endian because socket.ntohs(256) =", socket.ntohs(256))
else:
    print("big endian because socket.ntohs(256) =", socket.ntohs(256))

if socket.htons(256) == 1:
    print("Little endian because socket.htons(256) =", socket.htons(256))
else:
    print("big endian because socket.htons(256) =", socket.htons(256))
```

Output:

```
student@systems-vm:~/os/operations_system/sockets_assignment2> python3 part_bc.py
Little endian because socket.ntohs(256) = 1
Little endian because socket.htons(256) = 1
```

As the output shows on part b->a, on both sides are big and the output is 256 which is the data sent to client side.
In part b -> b, we can see that when one side is different from the other side (eg. little on client & big on server, or big on client & little on server), the output is 1.
As you see on part b-> c, it is a little endian because of the output from ntohs and htons.

Part C: Reimplement your chatbot from Assignment 1 as a client-server system. The front end (the client) should interact with the user, the back end (the server) should handle the response logic, and the two should communicate via sockets, using protocol of your own design.

Client

```
#!/usr/bin/env python3
from socket import *
s = socket(AF_INET, SOCK_STREAM)
s.connect(("127.0.0.1", 7069))
while 1:
    data = s.recv(10000)
    print(data.decode())
    message = input()
    s.send(message.encode())
    if len(data) == 0:
        break
s.close()
```

Report for Assignment2

Ken Amamori
3/2/2021

Server

```
#!/usr/bin/env python3
from socket import *
s = socket(AF_INET, SOCK_STREAM)
s.bind(("127.0.0.1", 7069))
s.listen(5)
c,a = s.accept()
counter = 0
while True:
    if counter == 0:
        c.send("Hello, welcome to chatbot program.".encode())
        c.send("Enter only either \"yes\" or \"no\".".encode())
        counter += 1
    elif counter == 1:
        if data == "yes":
            c.send("import file but currently not available.".encode())
            c.send("System:\tHello, are you male or female?".encode())
            counter += 1
        elif data == "no":
            c.send("Enter input; but currently not available.".encode())
            c.send("System:\tHello, are you male or female?".encode())
            counter += 1
        else:
            c.send("Please enter in the correct format ... \n".encode())
    elif counter == 2:
        if data == "female":
            c.send("How excellent! Are you a CS major?".encode())
        elif data == "male":
            c.send("Me too. Are you CS major?".encode())
        else:
            c.send("Great! Anyways, are you CS major?".encode())
        counter += 1
    elif counter == 3:
        if data == "no":
            c.send("Too bad. Anyway, what's an animal you like, and two you don't?".encode())
        elif data == "yes":
            c.send("Excellent, I am too. What's an animal you don't like, and two you don't?".encode())
        else:
            c.send("Cool! By the way, what's an animal you like, and two you don't?".encode())
        counter += 1
    elif counter == 4:
        data1 = data.split(',')
        msg = "%s awesome, but i hate %s too. Bye for now." % (data1[0].strip(), data1[-1].strip())
        c.send(msg.encode())
        counter += 1
    else:
        c.send(''.encode())
    data = c.recv(1000).decode()
c.close()
```

```
student@systems-vm:~/os/operations_system/sockets_assignment2> python3 part_c_client.py
Hello, welcome to chatbot program.Enter only either "yes" or "no".
yes
import file but currently not available.System: Hello, are you male or female?
male
Me too. Are you CS major?
no
Too bad. Anyway, what's an animal you like, and two you don't?
dog,snake
dog awesome, but i hate snake too. Bye for now.
```